Structural Genomics of ORFan Genes from *Halobacteriun* sp. NRC-1: Homologous Expression of the Cloned Genes in *Halopherax Volcanii*

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With the availabilty of growing number of complete genomes novel approaches for the study of protein function, structure and evolution have begun to develop. For instance, sophisticated computational methods for fold assignment, such as fold recognition or threading, are able to extend the number of assignable sequences. These methods are, however, only useful when the 3D structure of at least one member of a family is known. Therefore there is an urgent need for increasing the number of known folds.

ORFans genes (i.e. ORF's from a given genome that share no sequence similarity with ORF's of other organisms) may represent a cache of novel folds and hence are attractive for structural genomic projects. Accordingly, this project addresses structural description of orfan-encoded proteins from the halophilic archaeon *Halobacterium* sp. NRC-1.

The first stage of the work involved ORFans target selection for structural studies. In such selection, we focused on targets that are most likely to provide a novel functional and/or structural insight. As such, we begin with paralogous ORFan families, as it is reasonable to assume that these indeed correspond to true expressed proteins.

Expression of these genes in another halophilic archaeon is needed for verifying their native structure and in parallel determining their predicted function.

A set of 45 ORFans were selected and divided to 15 groups. Fifteen of these genes were cloned into the shuttle vector pJAM202 under the regulation of an haloarchaeal promoter and tagged by six histidine residues in the C-terminus and introduced into *Haloferax volcanii*. Six of the encoded proteins were expressed and purified on NiNTA resin. Efforts aimed at determining the 3D structure of these proteins, and hence possible functional assignment, are underway.